

## 2025(Backlog)

*Time : 3 hours*

*Full Marks : 60*

*Candidates are required to give their answers in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

*Answer from both the Groups as directed.*

### **Group – A**

#### **(Compulsory)**

1. Answer all questions of the following :  $1 \times 10 = 10$ 
  - (a) Write Sackur Tetrode equation.
  - (b) Write any one property of thermal radiation.
  - (c) What do you mean by liquid helium ?
  - (d) What is the upper limit to the mass of the Chandrasekhar limit ?
  - (e) What is the formula of classical entropy ?

- (f) What is the principle of black body radiation ?
- (g) What is the primary formula to find the specific heat of a metal ?
- (h) Define Gibbs paradox.
- (i) What are ensemble in statistical mechanics ?
- (j) What is meant by thermodynamic probability ?
2. What is relativistic Fermi gas ? 5

**Group – B**

**(Descriptive Type Questions)**

Answer any three questions of the following :

15×3 = 45

3. State Stefan's-Boltzmann law of radiation. Deduce this law on thermodynamic considerations.
4. What are Fermions ? Derive an expression for the probability distribution of particles governed by Fermi-Dirac statistics.

HE – 143/1

(2)

Contd.

5. Derive the theory of Bose – Einstein condensation. Mention its properties.
6. State and proof law of equipartition of energy. How do we use the equipartition law to calculate specific heat ?
7. Write short notes on any **three** of the following :
- (a) Photon gas
- (b) Planck's quantum postulate
- (c) Radiation pressure
- (d) Electron gas in a metal



HE – 143/1 (400) (3)

UESE(VI) —  
Phy (C – 14)